

NASA TECH BRIEF

NASA Pasadena Office

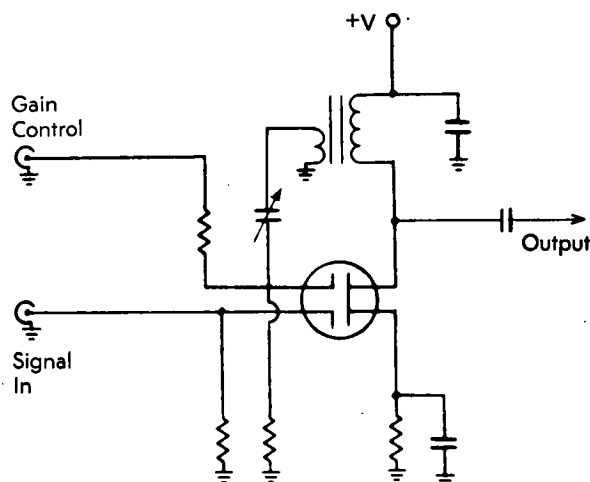


NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

Low Phase-Shift Amplifier

The problem:

To decrease the phase shift which occurs in the output of an amplifier when the automatic gain control (AGC) is changed.



The solution:

Use a broadband transformer to neutralize the distributed capacity between the drain and control gate of a dual-gate MOSFET.

How it's done:

The single-stage MOSFET amplifier shown in the diagram is identical to a standard neutralized amplifier except that the neutralization provided by a broadband transformer is applied to the AGC gate instead of the signal gate; this arrangement cancels effects attributable to the capacitance existing between the

control gate and the drain.

There is an RC network which consists of the drain-to-control-gate capacity and the channel resistance. The channel resistance varies with a change of voltage on the control gate and causes the RC time constant to change; as a result, there is a change of phase from input to output of the amplifier. Neutralization of the drain-to-control-gate capacity minimizes the phase change induced by variation in AGC.

The amount of phase shift vs gain in a three-stage amplifier was found to be $\pm 0.3^\circ$ for a gain change from 10 dB to 50 dB. The amplifier will handle signal levels up to about one volts rms. The noise figure is about 9 dB at 10 MHz when driven from a 1000-ohm source.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: TSP72-10185

Patent status:

NASA has decided not to apply for a patent.

Source: George F. Lutes and
Richard C. Coffin of
Caltech/JPL
under contract to
NASA Pasadena Office
(NPO-11663)

Category 01